

Lesson 10

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2- Solid-State Drives (SSD)

- Refers to the fact that the primary storage medium is through semiconductors rather than a magnetic media such as a hard drive.(no moving parts)
- It also will use either the ATA or SATA drive interfaces



Advantages and Disadvantages

- | | |
|---|--|
| <ol style="list-style-type: none">1. <u>Less Power Usage</u> (no power draw for the motors, the drive uses far less energy than the regular hard drive.2. <u>Faster Data Access</u> (20% speed increase in the booting of Windows XP)3. <u>Higher Reliability</u> (fewer moving parts to be damaged in any sort of impact.) | <ol style="list-style-type: none">1. <u>more expensive</u> technology2. not yet available in <u>capacities high</u> |
|---|--|

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- SSD VS 7200rpm HD
http://www.youtube.com/watch?v=lkkHEvfpu_eA&NR=1
- <http://www.youtube.com/watch?v=96dWOEa4Djs>

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Solid state drives and USB flash drives both use the same type of non-volatile memory chips that retain their information even when they have no power.

SDD

- The difference is in the form factor and capacity of the drives.
- Internal and external

USB

- external

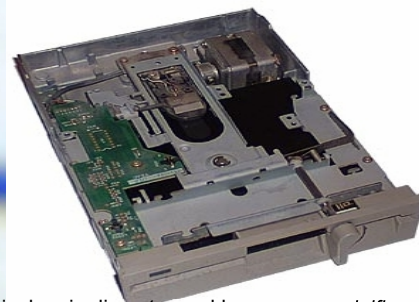
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3-Floppy Drives

- A *floppy disk* (or floppy diskette) is a magnetic storage medium that uses a diskette made of thin, flexible plastic enclosed in a protective casing.
- Portability
- limited storage capacity.

Floppy Drive Size	Tracks per Side	Sectors per Track	Capacity
5¼" DD	40	9	360KB
5¼" HD	80	15	1.2MB
3½" DD	80	9	720KB
3½" HD	80	18	1.44MB
3½" ED	80	36	2.88MB

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the *microfloppy diskette* is a diskette that is 3. inches in diameter and known as a *minifloppy* 5. inches in diameter



Zip drives

- A zip drive is similar to a floppy drive, but it is a little bit larger physically and stores more information.
- A zip drive can store 100MB or 250MB or 750 MB. of data ,depending on what type of drive it is.
- These drives were popular solutions for backing up data before CD-ROMs and external drives became popular.



Jaz drive

- The Jaz disks were originally released with a 1 GB capacity and end with 2 GB
- The Jaz drive utilized only the [SCSI](#) interface (the [IDE](#) internal version is rare), but an adapter known as **Jaz Traveller** was available to connect it to a standard [Parallel Port](#).



Optical Storage Drives

- CD-ROMs,
- DVD-ROMs,



CD-ROMs,

- *Compact Disc–Read Only Memory (CD-ROM)* is an optical storage technology that uses a laser to read and write data.
- Originally, as the name implies, one could only read from CD-ROMs.
- Originally, CD-ROMs stored 650MB of data and could store 74 minutes of music, but today's CD-ROMs store 700MB of data or 80 minutes of music.(800MB, 900MB)
- The speed (transfer rate) of the CD-ROM is measured in multiples of 150 KBps and is indicated with an X.
- For example, an old 1X (pronounced "one times") CD-ROM had a transfer rate of 150 KBps, while an 8X has a transfer rate of 1200 KBps ($150 \times 8 = 1200$). After 48X has a transfer rate



CD Recordable (CDR) CD burners



- Can Read
- Can write only once
- A CDR is an example of a *Write Once Read Many (WORM)* disc.
- You can write to a CDR multiple times, but you cannot overwrite areas of the disc that have already been written to.
- This means that with a CDR if you write to it many times the additional write operations are appending the information to the end of the CDR.
- Each burn operation that you perform is called a *session*, and most writeable CD drives today support multiple sessions.



CD ReWritable (CDRW)



- can reuse the CDRWs many times by reformatting the CD and starting again.



DVD



- *Digital Versatile Disks (DVDs)* are similar to CDs in the sense that they are another type of optical storage — but they store a lot more data.
- The standard DVD-ROM “1X” transfer rate is 600KBps, already four times that of the comparably labeled CD-ROM.
- As a result, to match the transfer rate of a 64X CD-ROM drive, a DVD-ROM drive need only be rated 16X.

Single-Sided Disc

- has a single layer of encoded information.
- These discs have a capacity of 4.7GB, many times

DVD DL, (doublelayer)

- realized by placing two media surfaces on the same side of the disc, one on top of the other, and using a more sophisticated burning mechanism that burns the inner layer without altering the outer layer and vice versa, all from the same side of the disc.

Double-Sided Discs

- by adding another media surface on the side of
- the disc where the label is often applied
- have a capacity exactly twice that of a single-sided disc.

DL technology to a double-sided disc

- have a disc capable of holding 17GB of information, again twice the capacity of the single-sided version.

Table 5-5 DVD Standards		
Standard	Specifications	Total Storage Space
DVD-5	Single-sided, single layer	4.7GB
DVD-9	Single-sided, double layer	8.5GB
DVD-10	Double-sided, single layer	9.4GB
DVD-18	Double-sided, double layer	17GB

The loss of capacity is due to the space between tracks on both layers being 10 percent wider than normal to facilitate burning one layer without affecting the other. This results in about 90 percent remaining capacity per layer.

Common names for the variations of DVD burning technologies include

DVD format and characteristics

Format	Characteristics
DVD-ROM	Purchased with data encoded; not able to be changed
DVD-R, DVD+R	Purchased blank; able to be written to once and then treated like a DVD-ROM
DVD-RW, DVD+RW	Purchased blank; able to be written to and erased multiple times; session usually must be closed for subsequent access to stored data
DVD-RAM	Purchased blank; able to be written to and erased just like a hard or floppy disk; no session to close before subsequent access to stored data



Blu-ray Disc

- was designed for modern high-definition video sources.
- A single-sided, single-layer hold 25GB of information
- A single-sided, double layer hold 50 GB of information
- and 100 GB per dual layered disc.
- Blu-ray discs can have four and six layers on a side 1 to 6 TB future capacity.
- backward compatible with standard DVDs and CDs
- “1X” transfer rate for Blu-ray is 4.5MBps, roughly 7.5 times that of the comparable DVD multiplier.
- **BD-R** discs can be written to once, whereas **BD-RE** can be erased and re-recorded multiple times.



Tape Backup Devices

- An older form of removable storage
- They are primarily used for archival storage
- They hold much more data than any other medium but are also much slower.
- Tape backup devices can be installed internally or externally

Sequential Tape Formats

Format Name

Quarter-inch Cartridge (QIC)

Digital Linear Tape (DLT)

Eight Millimeter (Exabyte)

Digital Audio Tape (DAT)/Digital Data Storage (DDS)

Linear Tape-Open (LTO)



Flash drives (A USB thumb drive)

- Flash drives, also known as thumb drives or memory sticks, are the popular method for carrying data from computer to computer.



Flash cards

- **MultiMedia Card (MMC)** and **Secure Digital (SD)** is a non-volatile memory card format developed by Matsushita, SanDisk, and Toshiba for use in portable devices.
- Today it is widely used in digital cameras, digital camcorders, handheld computers, PDA's, media players, mobile phones, GPS receivers, and video games.
- The benefit of flash cards is that most computers and laptops have ports on them that you can insert the memory card into.
- This allows you to upload pictures or music to the memory without needing to connect the camera,





eSATA-Attached External Disk Drives



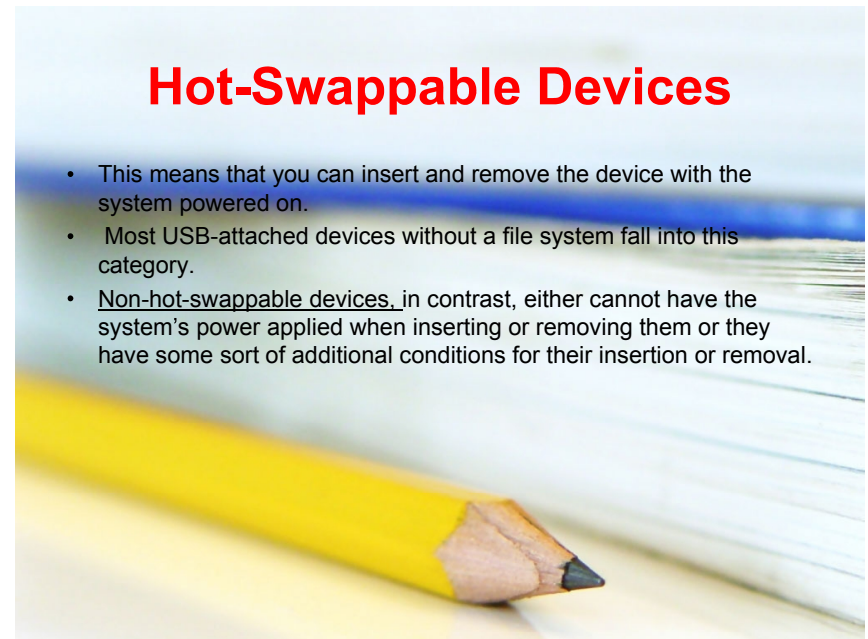
USB-Attached External Disk Drives

- Before USB, an external drive used a proprietary adapter and interface/cable combination or the standard RS-232 serial or the parallel port usually built in to the computer.
- Many external optical and hard disk drives today are manufactured into their own chassis and have detachable connectivity for USB (and/or FireWire).
- If the power requirement for the unit is high enough, there might also be a separate power connection for the device.
- external chassis



Hot-Swappable Devices

- This means that you can insert and remove the device with the system powered on.
- Most USB-attached devices without a file system fall into this category.
- Non-hot-swappable devices, in contrast, either cannot have the system's power applied when inserting or removing them or they have some sort of additional conditions for their insertion or removal.



Non-hot-swappable

cold-swappable	warm-swappable.
<p>devices must have the system power off before you can insert or remove them.</p> <p>An example of PS/2-style mini-DIN connector, such as a keyboard or mouse.</p> <p>Insertion with the power on generally results in lack of recognition for the device and might damage the motherboard.</p> <p>AT keyboard and the full-sized DIN connector have the same restriction.</p>	<p>Warm-swappable devices include USB thumb drives and external drives that have a file system.</p> <p>Windows and other operating systems tend to leave files open while accessing them and write cached changes to them at a later time, based on the algorithm in use by the software.</p> <p>Removing such a device without using the Safely Remove Hardware utility can result in data loss.</p> <p>However, after stopping the device with the utility, you can remove it without powering down the system, hence the “warm” component of the category’s name.</p>